Research Update

March 2011

Joint Centre for Disaster Research

GNS Science – Massey University, School of Psychology

Welcome to the latest of the research updates from the Joint Centre for Disaster Research. The centre opened in December 2006 and is a joint venture between Massey University and GNS Science within the School of Psychology, based at the Massey University campus in Wellington.

The centre undertakes multi-disciplinary applied teaching and research aimed at:

- gaining a better understanding of the impacts of natural, man-made, and environmental disasters on communities;
- improving the way society manages risk;
- enhancing community preparedness, response to and recovery from the consequences of natural, man-made and environmental hazard events.

SPECIAL NOTE

Our thoughts are with people in Christchurch at this time.
This newsletter was largely prepared in the weeks before the
22 February 2011 Christchurch earthquake.

Coping with psychosocial aftermath of another quake

Family and friends who live outside the zone of the earthquake in Christchurch should recognise that the reaction of those affected could be powerful and upsetting, a clinical psychologist coming from France and working for the University says. However, Maureen Mooney believes the difficult experience of having learnt to cope through last September's earthquake may eventually help devastated Christchurch residents who survived this disaster.

Ms Mooney, who is working on a research project with Massey, has just returned from Pakistan where as a consultant for the Red Cross she has been training people in psychosocial support following the severe flooding in that country. It was normal that the reactions of people involved in a natural disaster like the floods and the Christchurch earthquake are powerful and upsetting when they are responding to such an abnormal situation, she says.

"However this population has learnt, in a very difficult way, from last September's earthquake and the following powerful aftershock earthquakes, what are their strengths and this may in the long run be helpful to them in responding to this disaster.

"In the depths of this present crisis, most people will, with basic support, be able to slowly cope. We need to be able to provide this immediate support so that their own resources and recent capacity to cope with an earthquake can come to the fore. We must of course at first recognise and try and alleviate their suffering."

Visit our updated website: http://disasters.massey.ac.nz/

New members of the JCDR Team

Maureen Mooney has recently joined the JCDR and is currently working on a research project examining the effects of psychosocial interventions in Christchurch schools following from the September 2010 earthquake in Canterbury. She is a clinical psychologist who has been working in the Red Cross humanitarian field for the last ten years. Her job, as co-ordinator with the French Red Cross (FRC) and consultant for the Red Cross Movement, was to create and monitor the psychosocial response in the wake of disasters and develop programmes, along with the country's RC volunteers, that support vulnerable populations in a way that allows them to cope and bounce back. Community participation is a vital aspect of all parts of the response and recovery. She has worked in a wide number of countries from the Middle East, Africa, Asia, Europe and the Caribbean where the psychosocial responses were created in crisis situations such as Haiti and the Indian Ocean Tsunami, as well as in conflict situations such as Palestine, Ivory Coast and Cambodia. The programmes were designed for acute situations but also for ongoing crises of HIV/AIDS, famine, child protection and forced migration.

As a consultant on the Red Cross Roster, Maureen has recently completed a short mission to Pakistan for the Danish Red Cross facilitating a "Training of Trainers" for Pakistan Red Crescent staff and volunteers, working on the response to the recent disasters. These trainers will then go on to be a vital team working in upcoming disasters and difficult situations within the country. Responding to disasters when a country is overwhelmed is of course necessary but it is vital to develop sustainable responses by training local people for future interventions and planning, especially in geographical areas vulnerable to multiple disasters. Maureen is particularly interested in studying the factors that promote resilience and post-adversity growth without ignoring the need for adequate response to any distress and trauma.

Denise Blake has just joined the centre for a ten week fixed-term appointment as our Administrative Assistant. Denise is doing a PhD in psychology. Her qualitative research explores the way in which adoptees are enabled and constrained by the Aotearoa/New Zealand Adoption Act 1955, and the institutionalisation of adoption.

Stuart Fraser has joined the JCDR to begin a PhD in Emergency Management. His research interests include numerical modelling of tsunami, structural loading from earthquake ground motion and tsunami wave impact, and tsunami evacuation strategies. He joins the centre with four years of work experience as a catastrophe modelling analyst in the reinsurance industry.

John Lindsay is tenured as an Assistant Professor in the Applied Disaster and Emergency Studies department at Brandon University where he combines research with his 20 years of experience in emergency management. John worked in New Zealand for six years, first as a hazard analyst in Wellington and then managing the Auckland City Council emergency management program. He returned to Canada, joining Manitoba Health as a disaster management specialist from 1999 to 2005. John received the degree of Master of City Planning from the University of Manitoba in 1993, with a research focus on urban planning and emergency management, and is now pursuing a PhD through the JCDR. John contributes to the disaster management profession through research and at numerous conferences as both an organizer and speaker. He is a member of the CSA Technical Committee on Emergency Management, the American Red Cross scientific advisory council and served as ADES department chair from 2005 to 2010.

Victoria Sword-Daniels has recently joined the JCDR having started her PhD at University College London in September 2009. She is on secondment for 18 months in New Zealand to continue her research, which focuses on the physical and social impacts of volcanic ash fall on critical infrastructure systems. Her wider research interests include vulnerability, risk and emergency management aspects of volcanic hazards. She has travelled to Montserrat, Guatemala and Ecuador to complete fieldwork for her research. She also joins the centre with two and a half years of work experience in geotechnical earthquake engineering at an engineering consultancy in London.

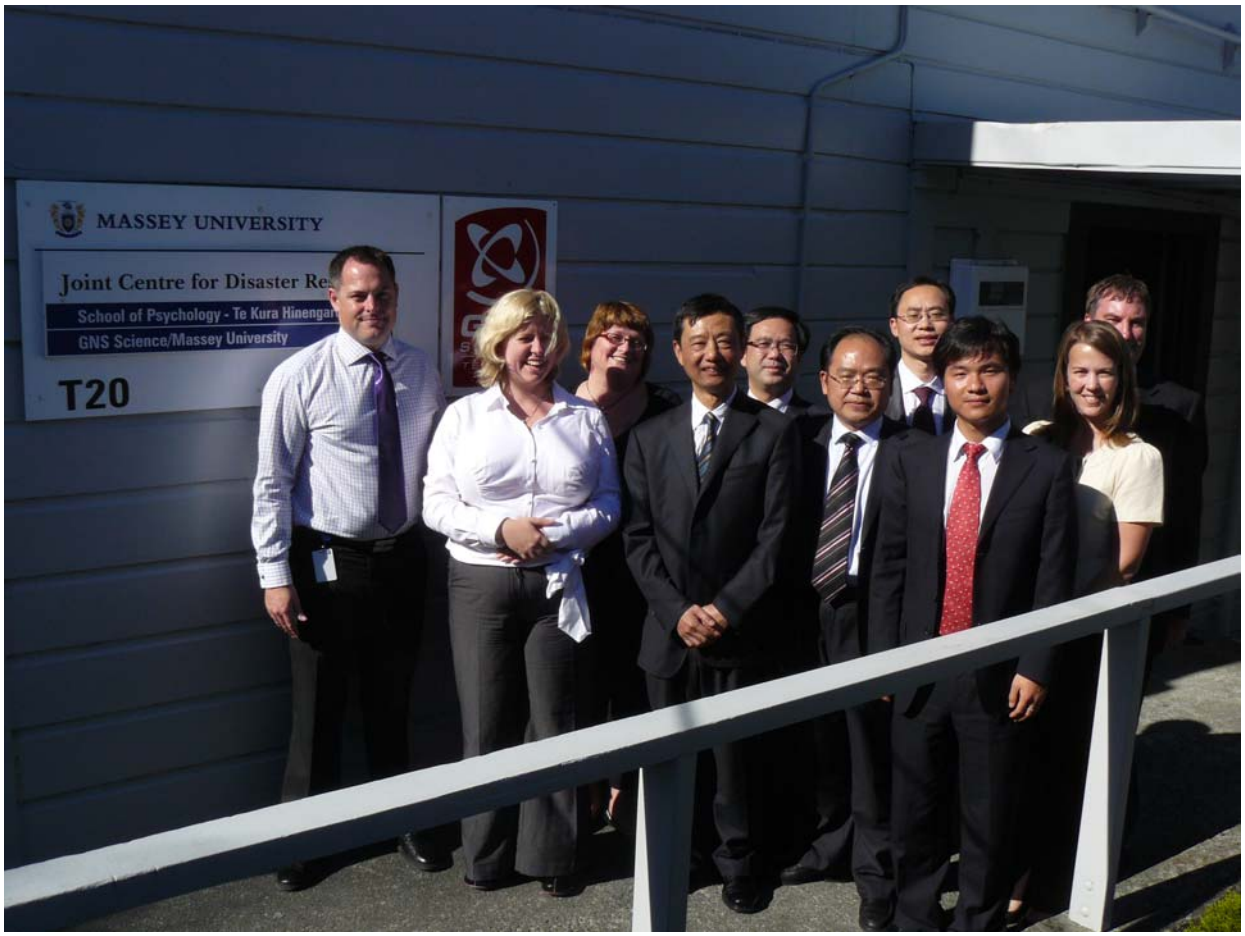
Visitors

Professor Nuray Karanci, from Middle East Technical University, Ankara, Turkey, will be a Visiting Scholar at the Centre from late February to mid May 2011. Her research interests include: Psychological impact of disasters; Preparedness and mitigation behaviours for disaster management; Community awareness and training programs for disaster awareness and management; Expressed emotion in caregivers of schizophrenic patients and patients with physical illnesses; Various projects in disaster/earthquake preparedness and mitigation; Cross cultural research in psychopathology and vulnerability factors.

Professor Richard Eiser, Department of Psychology, University of Sheffield, United Kingdom, will visiting for two weeks in March 2011. Richard Eiser is a Professor of Psychology at the University of Sheffield, and has previously held positions at the Universities of Exeter, London, and Bristol, and visiting positions in Canada, Switzerland, and Australia. He is a social psychologist with special interests in attitudes, social cognition, and risk perception. His research focuses on how attitudes change (or do not) as a consequence of experience, with applications to issues of natural hazards, health behavior, and energy research. He is also a member of the Research Committee of the UK Energy Research Centre.

Visit to the JCDR of the Sichuan Education Commission, China

The Sichuan Education Commission, China, led by Director General Tu Wentao, visited New Zealand from 16-21 February 2011 to learn more about disaster preparedness in New Zealand schools and institutions and Government policies and measures for equipping schools for civil emergencies. During their time in Wellington they visited the Centre and discussed opportunities for development collaborations between New Zealand and Chnia.



Research Partners

Staff and students from the JCDR are pleased to work closely with the research group Resilient Organisations (ResOrgs). Resilient Organisations (ResOrgs) is a multi-disciplinary team of 17 researchers and practitioners that is New Zealand based and with global reach. It is a collaboration between New Zealand research universities and key industry players.
ResOrgs is funded by the Natural Hazards Platform and supported by industry partners and advisors. The research group represents a synthesis of engineering disciplines and business leadership aimed at transforming NZ organisations into those that both survive major events and thrive in the aftermath.

For more information refer to their website:

http://www.resorgs.org.nz

Teaching Programme Update

Massey University celebrated 20 years of emergency management teaching last year and in the past six months we have made some of the most significant enhancements to the programme.

E-Learning

The most noticeable change is the introduction of our online learning system called STREAM. Using the Moodle e-learning platform it integrates a range of other systems including Turnitin™ (plagiarism checker), eTV, Adobe Presenter and Adobe Connect (virtual meeting and presentation space). An example of an introductory CIMS presentation in Adobe Connect/Presenter can be viewed at http://connect.massey.ac.nz/cims.

130705 Emergency Management, 130799 Research Report in Emergency Management, 230793 Special Topic (Emergency Management) papers have now all been revised and are available for study online. *130702 Coping with Disaster* is also available online and is scheduled for content review this year. *130701 Natural Hazards* will be offered next year via STREAM also. We have also been providing support to the Institute of Veterinary and Biomedical Sciences (IVABS) paper, *193.304 Animal Emergency Response* – a new paper offered this year for animal welfare and veterinary professionals involved in disaster response. This new paper can be taken as a Graduate Diploma in Emergency Management elective from 2012 (subject to academic approval). To log onto stream, visit http://stream.massey.ac.nz. We would also like to thank Vice Chancellor Steve Maharey who has made a short clip on YouTube (JCDRNZ) to welcome students to the emergency management programme.

As part of our e-learning enhancements, we have introduced a STREAM site called "130 Emergency Management". This site should be accessible by all our emergency management students, as it serves to provide information, news, research topics, useful websites, forums and study tips. A new Emergency Management Student Handbook has also been published online and mailed to new students. If you are a current student and unable to access this, please let us know. We have also set up social media networks including:

Facebook Group: Joint Centre for Disaster Research (JCDR)
Twitter: masseyem
Youtube: jcdrnz

Friends of the JCDR are encouraged to join our social networks, in particular Facebook as we are very active in posting topical issues, news and job alerts to this group.

Completion Support
In late 2010, we also sent an email to students who have not completed their Graduate Diploma in Emergency Management and who have been inactive, in an attempt to encourage students to return and complete their qualification. We are pleased to see our highest enrolments on record for 2011, with a 29% increase from last year – the demand for quality emergency management education is reflected in this growth.

International partnerships
The Joint Centre for Disaster Research also entered into two new partnerships to enhance our teaching programme. These include becoming a signatory to the International Principles of Emergency Management as espoused by the International Association of Emergency Managers and the Federal Emergency Management Agency. These principles are now part of the 130705 Emergency Management paper readings. For further information visit www.iaem.com/EMPrinciples/index.htm

The other partnership which JCDR has joined, is the Comprehensive Emergency Management Network. Massey University is the first institution in New Zealand to join this new global research group and membership is open to all who are interested. Visit www.cemr-network.org

Library resources

We have been working with library staff to review the current collection of emergency management literature and journal subscriptions. We are hopeful by late 2011, we will be in a position to announce further additions to our journal subscriptions in particular.

New qualification

We are pleased to advise that good progress is being made with our new Master of Emergency Management and plan this will be available from 2012 (subject to academic approval). The new Masters builds upon the Graduate Diploma in Emergency Management (which later requires to be surrendered), and requires the student to also complete a new paper in advanced leadership in emergency management as well other papers to meet credit requirements, including a research report. Students seeking a traditional thesis centred Masters, can still apply to study the Master of Philosophy/Arts, majoring in emergency management.

New electives

From 2012 (subject to approval), we plan to offer a wider range of electives for the Graduate Diploma in Emergency Management, including strategic management, public policy and law, leadership and change, development studies and animal emergency response.

Disaster Fact Sheet Series

Massey University and the University of Canterbury have been working together to launch a series of fact sheets to better disseminate student research outputs, from works such as reports, special topics, projects and thesis. These will be made available as they are developed from the JCDR website. For most Massey University students, this is now a compulsory requirement for special topic and research reports in emergency management.

Student Support

We have also set up a Skype account for programme coordination. This helps not only domestic students, but those students studying overseas. Our Skype user name is: **masseyem**

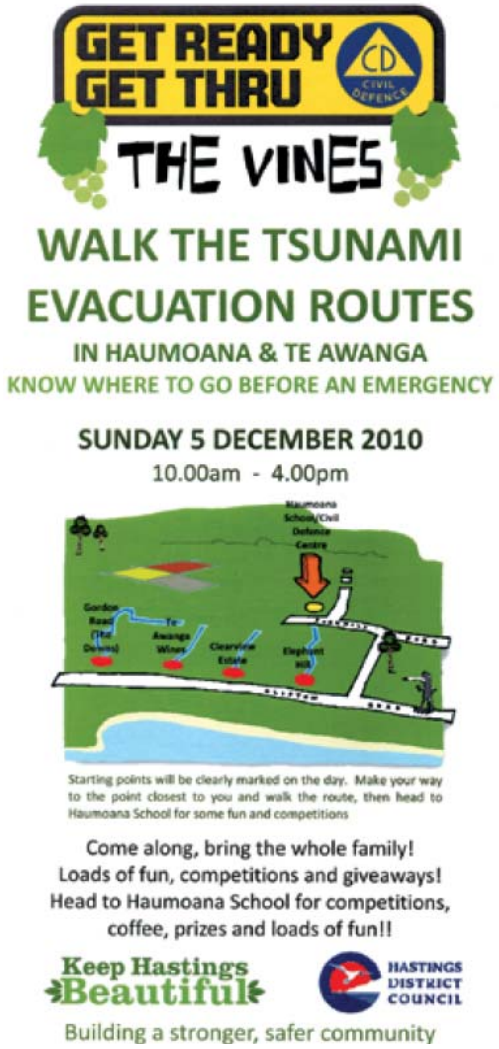
All the best for your study in 2011.

Steve Glassey
Senior Tutor & Programme Coordinator

Phone 0800 MASSEY extension 62167
Email S.Glassey@massey.ac.nz

‘Get Ready Get Thru The Vines: Walk the tsunami evacuation routes’

Hastings District Council organised a ‘Get Ready Get Thru The Vines: Walk the tsunami evacuation routes’ day from 10am to 4pm on December 5th, 2010 in Haumoana, Clifton, and Te Awanga. A siren test was also conducted. Graham Leonard and Kim Wright helped evaluate the effectiveness of (a) the four evacuation routes and (b) the public alerting siren and message. Two studies were conducted: (1) a ‘participant’ survey for the public walking through each route and (2) an ‘observer’ survey conducted at a variety of distances from each siren test. The project report provides summary of key results. The majority of public participants heard about the event from the flyer drop to letterboxes or the newspaper. Four evacuation routes were trialled by the public. Elephant Hill may generally be a faster route (average 15 minutes), compared to The Downs (average 29 minutes). The average walking time across all routes was 22 minutes. In general participants indicated that the routes could be used in the dark with a torch, in all weather, but with some mobility impaired people finding them difficult or slower.



There were no significant cross-tabulations (such as evacuee age) to travel time. Participants indicated a range of welfare items they would like to take with them and have at the safe location, especially food and water. Pets were identified as an issue. Many people brought children to the event. Ninety percent of respondents were travelling in groups, which ranged in size from two to seven people. Assume the siren’s minimum effective range is about 180m (i.e. it may be effective further away, but is particularly effective within 180m) for people who are not hearing impaired, are outdoors, on a calm day, without significant ambient noise.

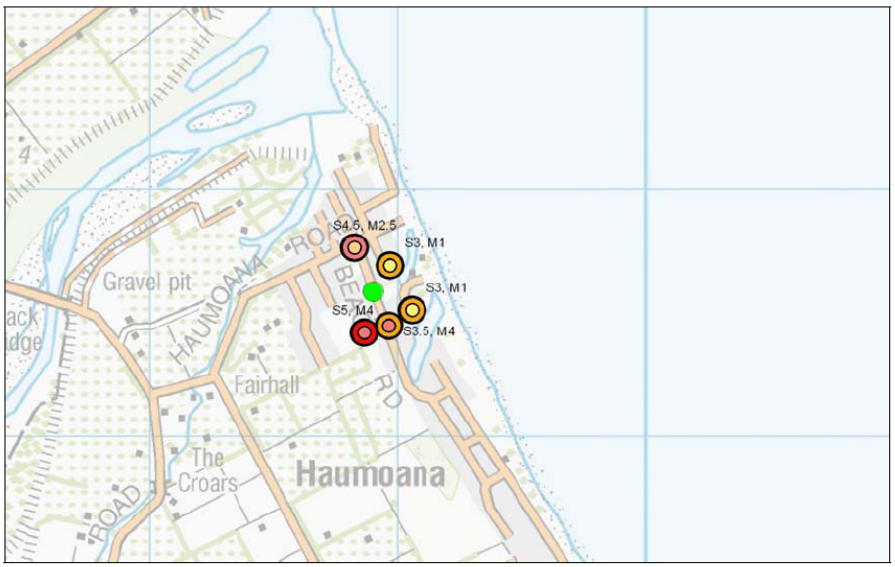


Figure 5 Audibility for 12:30pm test – fixed

In contrast, the public alerting message as it stands (see recommendation 2) has a minimum effective range of 120m. An effective range for the alerting message and especially the siren may be up to 300m, depending on wind conditions and the terrain between the siren and the persons needing to hear it. It is recommended that the levels of the siren and message are balanced so they have the same breadth of bass vs. treble, and same peak dB. We tested the siren with observers, who either knew the exact time or location of test, and also with public participants, who at least knew something related to Civil Defence was happening; tests of other scenarios should ideally also be undertaken, including indoors and during bad weather.

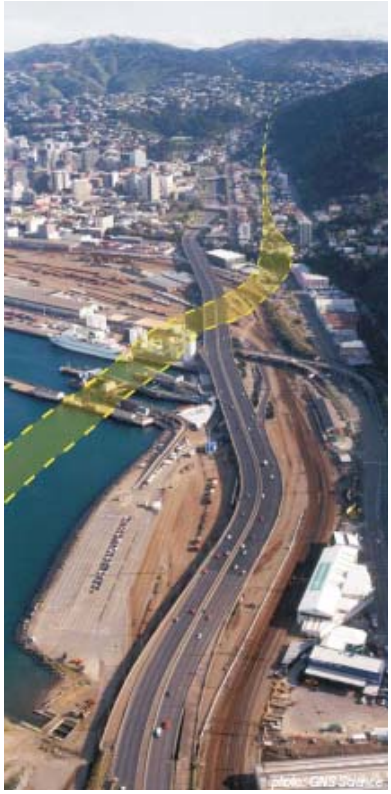
Leonard, G.S. and Wright, K.C. 2010. Evaluation of Get Ready Get Thru The Vines, *GNS Science Report* 2011/01. 22p. *(available free from the centre’s website)*

Preparing schools for future earthquakes in New Zealand: lessons from an evaluation of a Wellington school exercise

A recently published paper describes a project to observe and evaluate an earthquake response and evacuation exercise in a Wellington primary school (Years 1-8) comprising 200 pupils and 15 staff. Processes and behaviours were observed by a team of six emergency management personnel who met with teachers at the conclusion of the exercise to discuss the exercise and identify areas requiring modification.

Key lessons learnt include the following: frequent, well-learned emergency practices are likely to increase the probability that in a real emergency at school, staff and pupils will respond in an informed and predictable manner, and engage in behaviours that are recognised as best practice, and; schools that have well developed and regularly practised emergency preparedness plans in place send a message to pupils and caregivers alike that in the case of an emergency, the school is prepared to protect the safety of the children. Lessons learnt will inform future hazards preparedness in New Zealand schools, and promote community resilience in the event of a significant earthquake.

Figure 1(above) Children of Ridgway School, Wellington, taking part in their annual earthquake drill (photo D Johnston)
Figure 2(below, left) The Wellington fault running through the centre of the city (Photo: GNS Science)
Figure 3(below, right) Children and teachers assembling on the school field as part of the 2007 drill. (Photo: D Johnston)



Johnston, D., Tarrant, R., Tipler, R. Coomer, M., Pedersen, S., Garside, R. 2011. Preparing schools for future earthquakes in New Zealand: lessons from an evaluation of a Wellington school exercise. Australian Journal of Emergency Management 26:24-30.

Massey University to attend Homeland Security Summit

Above: Massey University's Steve Glassey will be attending the Homeland Security Summit in March as part of a Ministry of Science & Innovation delegation.

The Department of Homeland Security is hosting its fifth Annual University Network Summit next month in Washington DC. The Ministry of Science and Innovation is sending a delegation of five leading academics to represent New Zealand at the Summit. The Summit has a focus on catastrophes and complex systems in the transportation sector and will be attended by a range of agencies with homeland security and emergency management responsibilities. The invitation to the Summit is part of the wider science and Technology Cooperation Agreement (STCA), signed between the Ministry of Science and Innovation and the US Department of Homeland Security last year.

Included in the delegation is Senior Tutor Steve Glassey, from the GNS Science/Massey University Joint Centre for Disaster Research. Steve is responsible for coordinating the emergency management teaching programme, as well as acting as the liaison at the Joint Centre for STCA initiatives. Steve has been involved in US emergency management as a CEM Commissioner for the International Association of Emergency Managers (IAEM) and has been a guest speaker at the DHS Federal Emergency Management Agency Higher Education Conference, so the trip will be a good opportunity to reconnect with his American colleagues. Upon their return, the delegation will report on the summits outcomes and identify areas of further collaboration between the two countries.

For further information contact: Steve Glassey Email S.Glassey@massey.ac.nz

The recognition and understanding of severe weather advice in New Zealand

The New Zealand MetService provides severe weather outlook, watch and warning advisories. These advisories are given for a range of weather event types, including heavy rainfall, strong winds, snow, storm surge, heavy hail, and more recently for thunderstorms. Outlooks, watches and warnings are differentiated by the time period between impact of a particular event and the time of prediction. MetService and GNS Science have produced a collaborative survey which assesses the recognition and understanding of severe weather advice provided by MetService prior to extreme weather events. The survey was conducted over three days in 2009 at the the annual Agricultural and Pastoral Show in Christchurch and has a response rate of n = 160. This data report summarises the results of the survey. In general there was recognition of the potential impact that could arise from a wide range of severe weather types. People were less confident in their answers when discussing awareness and understanding of the Metservice terms severe weather outlook, severe weather watch and severe weather warning.

Wright, K. C.; Johnston, D.M.; Becker, J.S. 2010. The recognition and understanding of severe weather advice in New Zealand: results of a 2009 survey, GNS Science Report 2010/65 12 p. *(available free from the centre's website)*

Evaluating of "What's the Plan, Stan?

Vicki Johnson (photo right), an American researcher from Washington, DC, has been awarded an Ian Axford Fellowship in Public Policy for 7 months of policy research in New Zealand. Beginning in February, Vicki is conducting an evaluation of "What's the Plan, Stan?," the Ministry of Civil Defence and Emergency Management's national school disaster preparedness programme. She will be facilitating 8 focus groups with primary and intermediate school teachers in the areas of Auckland, Christchurch, Hutt Valley, Invercargill, Manawatu, Napier, Nelson, and New Plymouth. Vicki will be looking the benefits and challenges of using "What's the Plan, Stan?" in the classroom and exploring ideas with teachers on how to improve the programme and increase uptake. Vicki will be working closely with MCDEM and will be advised by Dr. David Johnston at the JCDR.

Vicki is interested in bringing the results of this study back to the U.S. where the U.S. Federal Emergency Management Agency (FEMA) is currently looking at ways to improve disaster preparedness in schools and childcare on a national level. Formerly, Vicki was the Policy Director of the U.S. National Commission on Children and Disasters, which recently released over 100 policy recommendations to President Obama and the U.S. Congress on how to improve emergency preparedness, response and recovery to better meet the needs of children. The report can be found on the Commission's home page at www.childrenanddisasters.acf.hhs.gov. If you have questions or ideas for Vicki's project, you are welcome to contact her at Victoria.Johnson@dia.govt.nz.

DEVORA (DEtermining VOlcanic Risk in Auckland) project

http://www.iese.co.nz/Volcanology/DEVORA.aspx

Auckland is a vital link in New Zealand's economy, and the city and surrounding region are being developed as internationally desirable places to live and work. However, Auckland is built on a volcanic field (a group of small volcanic cones, lava flows or craters over a wide area) and is also at risk from ash fall from eruptions at large volcanoes in the central North Island and Taranaki. Our understanding of the Auckland Volcanic Field (AVF) is incomplete; previous studies have been largely ad hoc, with no integration into over-arching hazard and risk assessments and follow-through to end users.

The seven-year DEVORA research programme, which grew out of the 'Auckland: It's Our Volcano' project, is aimed at a much-improved assessment of volcanic hazard and risk in the Auckland metropolitan area, and will provide a strategy and rationale for appropriate risk mitigation. This will be based on increasing our understanding of the AVF through an integrated, multi-disciplinary, multi-agency study. The project is directed by Dr Jan Lindsay (U of Auckland) (above) and Dr Gill Jolly (GNS Science). Staff and students from the JCDR are working with colleagues from other universities and GNS Science on this project.

The interface between probabilistic hazard and risk assessment and volcanic risk and crisis management

Many communities around the world are vulnerable to the potentially devastating effects of volcanic eruptions and volcanic risk management and reduction is becoming more and more challenging as communities are often forced to encroach on volcanic regions that were previously uninhabited. Increasingly, volcano risk management procedures need to involve an economically and socially realistic assessment of risk, a better consideration of people's livelihoods and an increasing participation of those who are threatened by volcanic hazards, i.e. local communities. For over 40 years probabilistic seismic hazard analysis (PSHA) has been used in many earthquake risk management contexts, including earthquake insurance. In comparison, quantitative volcanic risk metrics have been proposed only very recently, and probabilistic volcano hazard analysis (PVHA) is thus still in its infancy. This is because volcanologists have traditionally favoured deterministic approaches to assess and mitigate volcanic risk, although increasingly the volcanological community is recognizing the value of a probabilistic approach in capturing the complexity of volcanic systems and the uncertainty associated with both physical process and scientific understanding. Notably, important advances have been made in the development of probabilistic approaches to eruption forecasting.

Mary Anne Thompson (photo right) has just began a PhD at University of Auckland, with Jan Lindsay and Gill Jolly to use selected New Zealand volcanoes as case studies to develop PVHAs and investigate how these can most effectively be utilized in volcanic risk and crisis management. The following three case studies will be investigated:

1. The Auckland Volcanic Field (AVF). The AVF is a potentially active basaltic monogenetic volcanic field where the next vent location is unknown. This case study will focus on the interplay between short-term probabilistic forecasting and decision making during a volcanic eruption. This will build on the work of Lindsay et al. (2010).

2. The Ruapehu 1995 eruption. Ruapehu is a frequently active andesitic stratovolcano whose last major eruption occurred in 1995-1996. In this case a PVHA will be applied retrospectively to the 1995-96 eruption, and directly compared with the decisions made during the crisis.

3. Okataina volcano. Okataina is a silicic caldera complex with several major periods of rhyolitic dome growth over the past 60 ka, typically triggered by mafic magma recharge. The most recent activity was basaltic (Tarawera eruption of 1886), although a major rhyolite eruption occurred as recently as 600 years ago (Kaharoa eruption). This case study will focus on the development of a long-term probabilistic volcanic hazard assessment at a volcano with good geological constraints on past activity, and how this may best feed into long-term risk management.

The aim will be, in each case, to understand and quantify those volcanic processes relevant for hazard assessment as well as the signals volcanoes give prior to an eruption, in order to develop a robust, consistent and quantitative framework for probabilistic volcanic hazard assessment and eruption forecasting. The wider supervision team includes J-C Galliard (U of Auckland), Warner Mazocchi (INGV), Laura Sandri (INGV) and David Johnston (JCDR).

On the dynamics of supereruptions: Towards improved response to New Zealand's caldera-forming eruptions

Team: Alexa Van Eaton, Colin J.N. Wilson, James McGregor

Large-scale explosive eruptions are common in New Zealand's geologic history, with the Taupo Volcanic Zone hosting the most productive silicic volcanic activity in the world. These eruptions are often dynamically complex, resulting in column collapse, generation of ground-hugging density currents and extensive production of hazardous fine ash. Furthermore, interaction of magma and surface water can generate 'wet' eruptions, producing ash clouds that behave like ash-laden thunderstorms. Their ascent is powered by moist convection driven by water phase changes rather than from initial momentum and initial magmatic heat. These kinds of complex volcanic events are poorly modelled using established techniques for ash cloud forecasting.

A PhD research project at Victoria University of Wellington investigates ash cloud dynamics from New Zealand's most recent supereruption. The 27 ka Oruanui event from Taupo volcano blanketed the country with >1100 km^3 of fine-grained volcanic ash and excavated the geometry of Lake Taupo as we know it today. The aim of the ongoing research is to develop an understanding of how large-scale wet eruptions, like those occurring through a caldera lake or ocean, behave fundamentally differently from their dry counterparts. Physical and textural details of deposits left behind by this eruption provide clues about how the clouds evolved through the atmosphere and deposited across the landscape. Fine-tuning high resolution eruption models to incorporate this information distinguishes ways in which 'dirty thunderstorm' and column collapse phenomena can be parameterized for faster operational models in the event of another large-scale eruption.

Photo caption: Due to prevailing Westerlies at the time of the 27 ka Oruanui eruption, significant amounts of ash were swept downwind across the Pacific. Only the Chatham Islands hold a reliable distal record of cloud dynamics at a distance > 800 kms from source. Alexa Van Eaton (Victoria University of Wellington) joined the research expedition to the Chatham Islands from 26 Jan – 2 Feb to collect intact samples of distal volcanic ash from New Zealand's youngest supereruption.

Effective communication of probability statements for crisis decision making: volcanic case studies

Emma Hudson-Doyle, David Johnston, John McClure, Douglas Paton.

During a volcanic crisis, probabilistic statements and forecasts about issues crucial to effective decision-making are often communicated to emergency management personnel and government officials. Effective decision making during a volcanic event is dependent upon how uncertainty (probabilistic information about evolving events) is accommodated into the situational awareness of these officials and emergency managers (i.e. their assessment and understanding of the available information, the definition of problems at hand, and their ability to act within time and risk constraints).

Formal reviews of the recent NZ volcanic emergency management exercise (Ruaumoko, 2007/2008) have identified that scientific uncertainty and probabilistic statements created a challenging environment for communication, response planning, and decision making. Psychological research into the public understanding of probabilistic phrases has shown that the framing, directionality and probabilistic format of these statements influence people's understanding, affecting their action choices. In a volcanic crisis situation, this can result in inappropriate decisions, due to a misinterpretation of a probabilistic warning or forecast and an incorrect assessment of the situation. In extreme situations, this could lead to delayed or unnecessary evacuations.

Early announcement of upcoming survey:

As part of Emma Hudson-Doyle's FRST Postdoctoral research, an online survey will be conducted over the next few months to assess the different perceptions of probabilistic warnings. We will be actively recruiting participants from emergency managers and scientists within NZ, across as many sectors and agencies as possible. This online survey will be anonymous, and in that respect it will only ask for people's general employment sector information and the field that their highest level of training or qualification is. If participants are willing, they can provide more specific details about their employment agency and job role.

How YOU can Help!

Please participate in this survey! When it becomes live, we will make a general announcement through the JCDR and on the website http://disasters.massey.ac.nz .Your help in this study is much appreciated, and will help us to identify suitable formats for communication between different agencies.

For further information please contact: **Emma Hudson-Doyle: e.e.doyle@massey.ac.nz**

Volcanic ash damage to New Zealand roof structures and materials

There has been substantial work analysing the collapse of residential roofs under very thick ash loads (>200 mm), but field observations in ash deposition zones indicate that most residential houses will not be exposed to sufficient ashfall loadings to produce structural failure of roofs. Instead, the most commonly-observed impacts of ash deposition on roofs are corrosion of metallic roof materials and gutters, and collapse of gutters (Figure 1). Currently there is very limited empirical data available in this area to determine vulnerability. Therefore this project attempts to better define what damage might be expected to metallic roofs and gutters following future volcanic eruption in New Zealand, and to better inform mitigation practices.

The specific aims are to analyse:

- The relative vulnerabilities of standard New Zealand metallic roofing and gutter materials to corrosion following volcanic ash exposure over time;
- The deterioration rates of metallic roofing and gutter materials; and
- The performance of standard New Zealand gutters under ash loading.

This study, which has been funded by the Earthquake Commission, is a collaborative effort between researchers at the University of Canterbury and BRANZ Ltd, and associates of the JCDR. The project leader is Professor Jim Cole, of the Department of Geological Sciences at the University of Canterbury, and others involved with the project are researchers Tom Wilson, Chris Oze, Allan Scott and Carol Stewart and research students Sam Broom, Grant Wilson and Dean Podolsky.

Figure 1 (above right): The problem - corrosion of roof cladding and gutter collapse following 200 mm of ashfall in Futaleufú, Chile following the 2008 Chaiten eruption (Photo: T. Wilson)

The first phase of the project involved the development and production of 'pseudo-ash' (an artificially-created material that models the properties of fresh volcanic ash and its highly active surface coating). Pseudo-ash was then used for corrosion testing using the experimental facilities at BRANZ. Samples of roofing material were coated in pseudo-ash and deployed into a testing chamber (Figures 2 and 3) for time periods ranging from one day to one month. Other work currently in progress is being carried out in VATLAB at the University of Canterbury. This includes testing the performance of gutter structures under different loadings of volcanic ash, and determining the effects of volcanic solvents on roofing materials (Figure 4). We anticipate that this project should be completed by the end of March 2011.

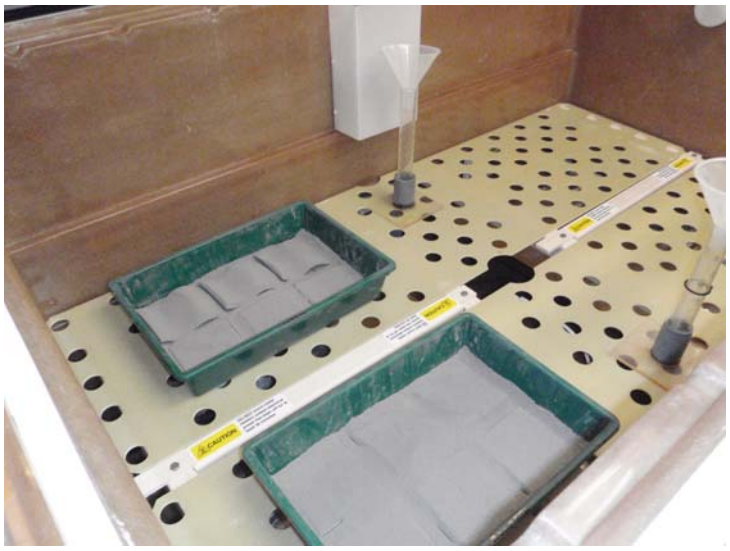


Figure 2 (above): BRANZ environmental test chamber that can simulate accelerated weathering under controlled conditions using various hot/cold/wet/dry cycles (Photo: T. Wilson)

Figure 3 (left): Allan Scott using a sieve to distribute dosed pseudo-ash over samples of roofing material for one-month trial in environmental test chamber (Photo: C. Stewart)

Figure 4 (right): Equipment for roofing and guttering experiments in the VaTLAB facility, University of Canterbury (Photo: G.Wilson)

No lessons learnt

A research article by Abdur Rehman Cheema (PhD student) has been recently published in one of the prestigious national English daily newspapers of Pakistan, The Dawn, on 2nd January, 2011. The article was related to the issues of disaster risk governance in Pakistan. An extract is published below. It is available in full on-line, free of cost, at the following link:

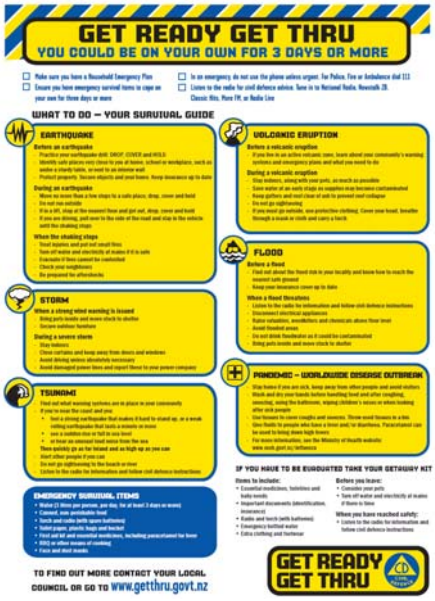
http://www.dawn.com/2011/01/02/no-lessons-learnt.html

UNDOUBTEDLY, Pakistan continues to face one of the biggest calamities in its history caused by the super floods of last summer. Although the 2005 Kashmir earthquake claimed far more lives, the 2010 floods have dwarfed the economic losses suffered by our economy from any other single natural disaster. Are floods a natural phenomenon? Gilbert F. White, the father of floodplain management in the 20th century, wrote in 1958 that floods were acts of God, but that flood losses were the result of human occupation of floodplains to a large extent. So shouldn't we think about what we need to do once the floodwaters have totally subsided? If we do not have full control over such floods what should we do to reduce losses in the future?

Lack of political will and adhocracy on behalf of the government are some other factors which cast a shadow on the future of disaster risk governance in Pakistan. If the government, policymakers, the bureaucracy, civil society, donor agencies and the political leadership of the country do not seriously deal with these institutional snags, not much would change once the floodwaters have subsided, and the people of Pakistan may not ever feel safe and secure, regardless of whether they expect disaster to strike in the form of torrential rains, flooding, landslides or earthquakes.

Public Education, Disaster and Emergency Management

The Centre's public education advisor, Dr Miriam Hughes has been busy in recent months. An examination of the current provisions within public education and disaster management is well underway. The information generated by this research along with qualitative and quantitative data gathered collaboratively with various agencies and the Ministry of Civil Defence and Emergency Management will form the basis for the development of a public education framework which can be used effectively by a variety of CDEM agencies, both within New Zealand and outside of it.



The Centre continues to assist nations in the Pacific with disaster management and recovery efforts. Miriam visited Samoa and American Samoa in August of 2010 to discuss recovery from the 2009 Tsunami and to learn and, where appropriate, provide feedback on public education programmes and initiatives currently being developed and implemented on both islands. She also attended the North Island Civil Defence conference in Whangarei, which helped immensely in broadening out her understanding of the CDEM context within New Zealand. In addition, Miriam attended other several other conferences which provided insights into disaster recovery and the psycho-social issues which are embedded within the recovery process.

The recent events in Christchurch as well as the floods and fires in Australia, while distressing, provide the potential for much rich data with which to increase our understanding of, and contribution to future public education programmes and initiatives. The Centre, and Miriam in her position of public education advisor will be working closely with CDEM agencies this year, both in New Zealand and in Australia to ensure that best practice is being observed in the provision of public education within New Zealand and that our contribution to public education within disaster and emergency management globally is as robust as possible.

Contact: Dr Miriam Hughes (m.e.hughes@massey.ac.nz)

New pandemic strategy for the UK

Dr Sarb Johal reports on his time with the UK Ministry of Health and their preparations for the next H1N1 season

After the experience of being one of the first countries to be significantly affected by the 2009 (H1N1) pandemic (like New Zealand), the UK Government agreed that a new pandemic strategy should be published in the spring of 2011. This should take account of the latest scientific evidence, lessons learned from the 2009 (H1N1) pandemic, and the need to ensure that these plans would be robust in the face of a pandemic that produced severe symptoms in a greater proportion of the population. After serving as a Private Secretary to a Minister of State for Health for 8 months, I was recruited to coordinate the production of this strategy in December 2010. Let me just say that it has been quite busy since then. This role has been diverse so far. As well as producing two iterations of the draft strategy so far, I have been responsible for communicating with Ministers and Permanent Secretaries within the Department of Health, and leading on cross-government acceptance and clearance of thorny issues and the strategy in general. This means working very closely with the Cabinet Office, which leads on general UK resilience for emergency events. I also have to take the advice of the various governance and science advice bodies into account on the more technical aspects of the strategy document.

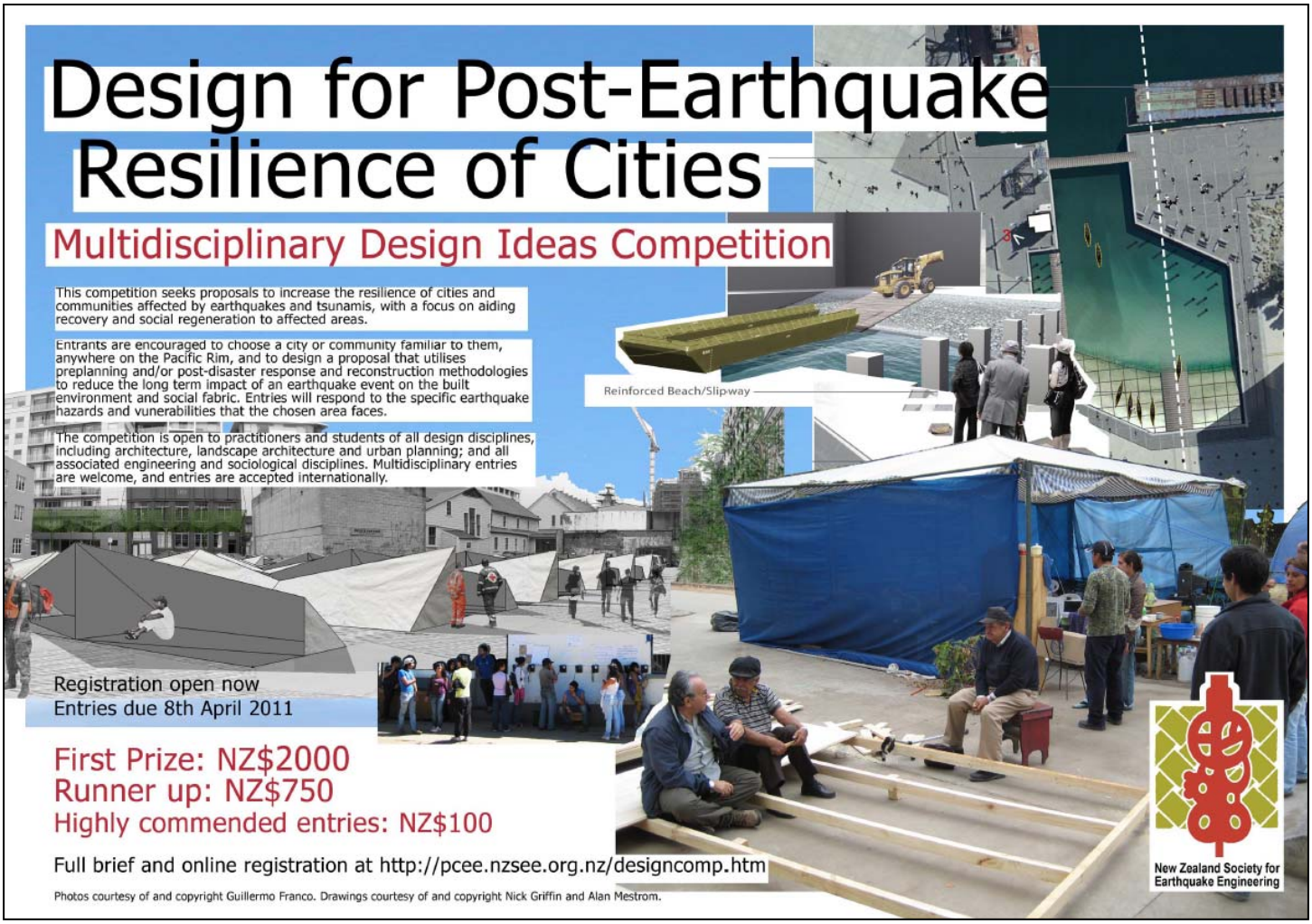

THE INDEPENDENT
SATURDAY EDITION
www.independent.co.uk
SINCE 1986 FREE FROM PARTY POLITICAL BIAS | FREE FROM PROPRIETORIAL INFLUENCE
• H1N1 virus returns, already claiming lives of 10 British adults
• Early signs that illness has spread to other European countries
Swine flu: it's back

It is a cliché, but it's a bit like herding cats. On methamphetamine. The cats that is, not me. At the time of writing, the third (and nearly final version), is being drafted to go up for Ministerial approval in mid-February. So far, they've not had a problem with what they've seen, although the seasonal 'flu outbreak did make them a touch nervous, and the major changes to the NHS and the new Health and Social Care Bill has meant that it has been challenging to get the Ministers to look and comment on this draft strategy. At this point, it was very useful to have Private Secretary contacts who personally flag to Ministers that this was something they needed to look at urgently. If they remain content, then we start the process of getting clearance from various Government Ministerial Committees, and from the Deputy Prime Minister, and Prime Minister. The strategy needs to be published on a particular day because of other constraints that I can't reveal here. It is a very tight timeline, but I get more confident of delivery as each day passes. I hope I didn't just jinx it by typing that last sentence.

New Zealand H1N1 studies available

Gray, L.; Mackie, B.; MacDonald, C.; Paton, D.; Johnston, D. M.; Johal, S.; Cunningham, C.; Wenn, J.; Baker, M. 2011. Dynamics of an effective risk communication campaign for Influenza A (H1N1), GNS Science Report 2011/04. 47 p. (available free from the centre's website)

The primary objective of the study was to rapidly provide health authorities with practical information to guide the development and delivery of key health messages for H1N1 and other health campaigns. The study collected qualitative information about community responses to key health messages in the 2009 and 2010 H1N1 campaigns, the impact of messages on behavioural change and the differential impact on vulnerable groups. A thematic analysis of the qualitative data identified four major themes and a number of sub-themes that represented how the New Zealand public understood and interpreted health messages about H1N1. The main themes were risk, building community strategies, responsibility and information sources. Exploring the participants' ideas, opinions and beliefs revealed many issues associated with the uptake of health risk messages. Combined with a comprehensive review of current New Zealand and international literature and relevant health behaviour theories, this report presents the major findings and suggests that engaging with communities will be essential to facilitate preparedness and build community resilience to future pandemic events. People wanted messages about specific actions that they could take to protect themselves and their families and to mitigate any consequences. They wanted transparent and honest communication where both good and bad news is conveyed. There was a clear desire across all groups for clear and specific information, such as infection and/or death rates and defining symptoms. This research provides a clear illustration of the complexities of how people understand and respond to health messages relayed to the H1N1 pandemic.



Teaching and Outreach

Staff and associates of the centre currently contribute to elements of the Graduate Diploma in Emergency Services Management and MA, MPhil and PhDs in Psychology, Emergency Management and other related disciplines. The Centre also plans to work with other organisations in the provision of training within the CDEM sectors. A series of Emergency Management short courses are organised by the centre in Summer and Spring.

Graduate Students – linked to the Centre

Debra Ellis (PhD student, School of Psychology, Massey University)
"Health sector emergency management roles in New Zealand"

Julia Becker (PhD student, School of Psychology, Massey University)
"Increasing Community Resilience: Understanding how individuals make meaning of hazard information and how this relates to preparing for hazards"

Wendy Saunders (PhD student with School of People, Environment & Planning, Massey University)
"Effective land-use planning for natural hazard management"

Ian de Terte (PhD student, School of Psychology, Massey University)
"Resilience and the prevention of work related traumatic stress: testing an ecological model"

James Hudson (PhD student, School of Psychology and Te mata o te Tau, Massey University)
"The Quantification of Iwi Development: A Framework for Iwi Development & Resilience"

Heather Taylor (PhD student, School of Psychology, Massey University)
"Children in disasters: Children's experiences of flooding in Surakarta, Indonesia"

Stuart Fraser (PhD student, School of Psychology, Massey University)
"The potential for using mid to high-rise buildings as vertical evacuation structures in near-source earthquake and tsunami events"

John Lindsay (PhD student, School of Psychology, Massey University)
"Maximising participatory planning in emergency management: implications for professional practice"

Yasir Javed (PhD student, Institute of Information and Mathematical Sciences, Massey University)
"Design, Implementation and Evaluation of Web-based Integrated Incident Resource Management System for decision support in Emergency Operation Centres"

Robyn Tuohy (PhD student, School of Psychology, Massey University)
"Disaster preparedness of older adults in New Zealand"

Sally Grant (PhD student, School of Psychology, Massey University)
"Effective management of a volcanic crisis at New Zealand calderas"

Belinda Beets (MSc student, School of Psychology, Massey University)
"Organisational responses to warnings of impending hazards: What can be learned from the September 2009 tsunami warning in New Zealand?"

Helen Sinclair (MPhil student, School of Psychology, Massey University)
"Decision making styles and processes within a functioning 'emergency operations centre' or 'emergency coordination centre".

Abdur Rehman Cheema (PhD student, Institute of Development Studies School of People, Environment and Planning, Massey University)
"Role of good governance in addressing vulnerabilities in disaster management in Pakistan"

Paul Schneider (Masters student, Institute of Development Studies School of People, Environment and Planning, Massey University) "Climate change, adaptive capacity and vulnerability – a coastal communities assessment for the Coromandel Peninsula"

Alexa Van Eaton (PhD student, Department of Earth Sciences, Victoria University of Wellington)
"On the dynamics of super-eruptions: Towards improved response to New Zealand's caldera-forming eruptions"

Brenda Mackie (PhD student, School of Psychology, University of Tasmania)
"Psychological preparedness for bushfires: risk perception, social context and resource theories"

David McIvor (PhD student, School of Psychology, University of Tasmania)
"Means-end chain modelling of natural hazard preparedness"

Mai Frandsen (PhD student, School of Psychology, University of Tasmania)
"Community predictors of effective adaptation to bushfire risk"

Briony Towers (PhD student, School of Psychology, University of Tasmania)
"Children's perception of bushfire risk and mitigation: A developmental perspective."

Charlotte Brown (PhD student, Department of Civil Engineering, University of Canterbury)
"Disaster debris management."

Monica Gowan (PhD student, Health Sciences Centre, University of Canterbury)
"Self-management of disaster risk and uncertainty: evaluating a personal health-based wellness paradigm for building disaster resistance."

Jennifer DuBois (PhD student, Department of Geological Sciences, University of Canterbury)
"The plausiblity of a submarine landslide generated tsunami at Kaikoura Canyon."

Johnny Wardman (PhD student, Department of Geological Sciences, University of Canterbury)
"Quantitative analysis of "flashover" potential for high voltage transmission equipment exposed to volcanic ash."

Grant Wilson (MSc student, Department of Geological Sciences, University of Canterbury)
"The effects of volcanic ash and gas on modern laptop computers and materials used for volcano monitoring".

Julian Idle (MSc student, Department of Geological Sciences, University of Canterbury)
"Multi-hazard risk analysis of Lyttelton, New Zealand".

Zachary Whitman (MSc student, Department of Geological Sciences, University of Canterbury) "Business risk perception and resiliency in an all-hazard environment: an analysis of the relationship between the public and private sectors in New Zealand".

Victoria Sword-Daniels (EngD student, Department of Civil, Environmental and Geomatic Engineering, University College London) "Evaluating impacts on community infrastructure following recent volcanic eruptions."

Sultan Al-Shaqsi (PhD student, Preventive and Social Medicine Department, University of Otago) "National audit of emergency preparedness of acute care in Oman and New Zealand"

Vivienne Bryner (PhD student, Centre for Science Communication & Geology, University of Otago) "Communication of geoscience knowledge to achieve disaster risk reduction"

Mary Anne Thompson (PhD student, School of Environmen, University of Auckland) "The interface between probabilistic hazard and risk assessment and volcanic risk and crisis management."

Alice Yan Chang (PhD student, Department of Civil and Environmental Engineering, University of Auckland) "Resourcing for Post-disaster Reconstruction."

John Hewitt (PhD student, Department of Civil and Environmental Engineering, University of Auckland) "Understand priority reconstruction needs of a community during response and recover stage."

Temitope Egbelakin (Department PhD student, Department of Civil and Environmental Engineering, University of Auckland) "Incentives and Motivators to Enhance Seismic Retrofit Implementation."

Mohammad Reza Zare (PhD student, Department of Civil and Environmental Engineering, University of Auckland) "Earthquake effects on wastewater systems with particular emphasis on pipelines."

Tingting Liu (PhD student, Department of Civil and Environmental Engineering, University of Auckland) "Managing government exposure to public-private partnerships project risk."

Sandeeka Mannakara (PhD student, Department of Civil and Environmental Engineering, University of Auckland) "The integration of Build Back Better techniques into disaster reconstruction practices"

Reza Jafarzadeh (PhD student, Department of Civil and Environmental Engineering, University of Auckland) "Cost Modelling for Retrofit buildings."

New Publications

Becker, J.S. 2010. Understanding disaster preparedness and resilience in Canterbury: results of interviews, focus groups and a questionnaire survey, GNS Science Report 2010/50 97 p.

Chang, Y., S. Wilkinson, E. Seville, and R. Potangaroa (2010) "Resourcing for a resilient post-disaster reconstruction environment". International Journal of Disaster Resilience in the Built Environment 1(1): 65-83.

Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville (2010) "Resourcing challenges for post-disaster housing reconstruction: A comparative analysis". Building Research and Information 38(3): 247-264.

Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville (2010) "Interpreting resourcing bottlenecks of post-Wenchuan earthquake reconstruction in China". International Journal of Strategic Property Management 14: 314-331.

Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville (2011) "Donor-driven resource procurement for post-disaster reconstruction: Constraints and actions". Habitat International 35(2): 199-205.

Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville (in press) "Identifying factors affecting resource availability for post-disaster reconstruction: a case study in China". Construction Management and Economics (accepted, in press).

Chang, Y., S. Wilkinson, D. Brunsdon, E. Seville, and R. Potangaroa (in press) "An integrated approach: managing resources for post-disaster reconstruction". Disasters.

Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville (in press) "Resourcing for post-disaster reconstruction: a comparative study of Indonesia and China". Disaster Prevention and Management.

Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville (2010) Chapter 4 Resourcing for post-disaster reconstruction: A longitudinal case study following the earthquake in China. In Book Reconstructing for Resilience: Strategies for building sustainable communities after a disaster. Edited by D. Amaratunga and R. Haigh, London, Wiley-Blackwell.

Doyle, E.E., Cronin, S.J., Thouret, J-C. (in press). Defining conditions for bulking and debulking in lahars. The Geological Society of America Bulletin. Accepted 10th August 2010.

Doyle, E.E., Hogg, A.J., Mader, H.M. (in press). A two layer approach to modelling the transformation of dilute pyroclastic currents into dense pyroclastic flows. Proceedings of the Royal Society: A. Accepted 20th October 2010.

Gray, L.; Mackie, B.; MacDonald, C.; Paton, D.; Johnston, D. M.; Johal, S.; Cunningham, C.; Wenn, J.; Baker, M. 2011. Dynamics of an effective risk communication campaign for Influenza A (H1N1), *GNS Science Report* 2011/04. 47 p.

Javed, Y., Norris, T., Johnston, D., Hudson-Doyle, E. 2011. Toward a Framework for Crisis Decision Support Systems: Information Requirements for Contextual Team Situation Awareness. *Cutter IT Journal* 24:26-33.

Johnston, D., Tarrant, R., Tipler, R. Coomer, M., Pedersen, S., Garside, R. 2011. Preparing schools for future earthquakes in New Zealand: lessons from an evaluation of a Wellington school exercise. Australian Journal of Emergency Management 26:24-30.

Johnston, D. M.; Ronan, K. R.; Finnis, K.; Leonard, G. S. 2011. Children's understanding of natural hazards in Te Anau, New Zealand, following the 2003 earthquake, GNS Science Report 2011/05 18 p.

Leonard, G.S., Gregg, C.E., Johnston, D.M. (in press). Early Warning Systems. Peter T. Bobrowsky (ed.), Encyclopedia of Natural Hazards, DOI 10.1007/978-1-4020-4399-4

Leonard, G.S., Gregg, C.E., Johnston, D.M. (in press). Warning Systems. Peter T. Bobrowsky (ed.), Encyclopedia of Natural Hazards.

Leonard, G.S. and Wright, K.C. 2010. Evaluation of Get Ready Get Thru The Vines, *GNS Science Report* 2011/01. 22p.

Mackie, B. 2010. An annotated bibliography of recent research on pandemic preparedness, perceptions of risk and motivations for behaviour change, GNS Science Report 2010/40 24 p.

Paton, D., Johnston, D., Johal, S. (in press). Human impacts of disasters. In Peter T. Bobrowsky (ed.), Encyclopedia of Natural Hazards, DOI 10.1007/978-1-4020-4399-4.

Stewart, C., Wilson, T.M., Leonard, G.S., Johnston, D.M., Cole, J.W. Cronin, S. (in press) Volcanic Hazards and Water Shortages . In: Briggs, C.A. (ed.) Water Shortages: Environmental, Economic and Social Impacts. Nova Publishers.

Tipler, K.; Tarrant, R.A.C.; Coomer, M.A.; Johnston, D. M. 2010. School children's access to hazard education: An investigation to socio-economic status, *GNS Science Report* 2010/35 25 p.

Wilson, T.M., Cole, J.W. Stewart, C., Cronin, S.J., Johnston, D.M (in press). Ash Storms: Impacts of wind remobilised volcanic ash on rural communities and agriculture following the 1991 Hudson eruption, southern Patagonia, Chile. *Bulletin of Volcanology*

Wilson, T., Cole, J., Cronin, S., Johnston, D., Stewart, C. (in press). Impacts on agriculture following the 1991 eruption of Vulcan Hudson, Patagonia: lessons for recovery. *Natural Hazards*

Wright, K.; Doody, B. J.; Becker, J.; and McClure, J. 2010. Pedestrian and motorist flood safety study: a review of behaviours in and around floodwater and strategies to enhance appropriate behaviour, GNS Science Report 2010/51, 91 p.

Wright, K. C., Johnston, D.M., Becker, J.S. 2010. The recognition and understanding of severe weather advice in New Zealand: results of a 2009 survey, GNS Science Report 2010/65 12 p.

Upcoming Events

The Australasian Hazards Management Conference

Gold Coast, Australia, from 18-21 July, 2011

The conference theme this year is: "Major Events, Major Impacts"

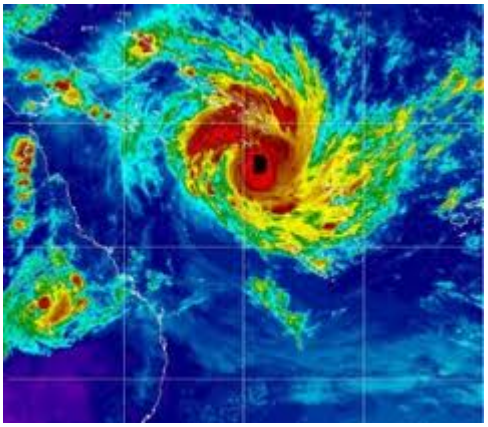
With the major disasters that have occurred within the Australasian region and around the world since the last conference, this year's conference will be an important forum to explore how we conduct research into such devastating hazards, and how we can reduce the associated risks, prepare the community for such natural hazards, and how we can respond to and recover from them.

As with previous conferences, the audience for the 2011 conference includes: Emergency managers, Policy makers, Researchers, Planners, Risk assessors, Asset and utility managers, Scientists, and Students.

Conference Format:

The 2011 conference will take the following format:

- Monday 18 July 2011 – Pre-conference workshops and master classes
- Tuesday 19 – Wednesday 20 July 2011 – Main conference
- Thursday 21 July 2011 – Technical tours addressing natural hazards and emergency management within South East Queensland.



Key Dates:

18 April 2011	Closing date for abstracts and workshop proposals
30 April 2011	Selection of papers and workshops
7 May 2011	Publication of final 2011 Conference Program
30 May 2011	Final date for early bird registrations
18 July 2011	Pre-Conference Workshops and Master Classes
19 – 20 July 2011	5th AHMC Conference
21 July 2011	Technical Tours

If you have any questions regarding this year's conference, please do not hesitate to contact the conference organiser:

Disaster Management Unit
Gold Coast City Council
PO Box 5042, Gold Coast MC QLD 9729 Australia

Contact: AHMC@GoldCoast.qld.gov.au

FRSITO
Fire & Rescue Services ITO

Enabling Emergency Management Coordination Conference 10 – 13 October 2011

Call for Abstracts

FRSITO is hosting the second biennial conference in Christchurch, New Zealand, on the above dates.

The focus of the conference is working collaboratively within and across agencies. The conference is expected to attract training personnel, from operational and strategic positions, covering a wide range of emergency management sectors.

We are now seeking submissions from organisations and individuals who would like to present at the conference. Presentations should link to vocational education practices for either training or assessment initiatives.

The conference will have both plenary and breakout sessions, and submissions should identify the type of session. Please note the organising committee reserves the right to discuss changes to the presentation type.

Where applicable breakout sessions may be given more than once to ensure delegates are able to attend a wide range of topics. Sessions are scheduled to run for 45 minutes and this should include time for questions.

Submission should be made by completing the Submission Form attached. Submissions close Friday 11 March, and should be sent electronically to: **liz@frsito.org.nz**

Location

The centre is part of the School of Psychology, in the College of Humanities & Social Sciences. The centre Director, staff and students are based at the Massey University campus in Wellington (Building T20). However, the centre draws on staff from other Massey campuses, GNS Science and other collaborating organisations. Visits to the centre are welcomed but by appointment only please.

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